

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

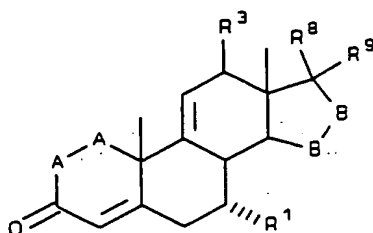
**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

CLAIMS

WHAT IS CLAIMED IS:

1. A process for the preparation of a compound of Formula II:



II

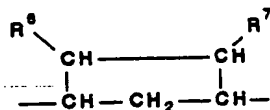
wherein

5            -A-A- represents the group -CHR<sup>4</sup>-CHR<sup>5</sup>- or -  
CR<sup>4</sup>=CR<sup>5</sup>-

10           R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from  
the group consisting of hydrogen, halo,  
hydroxy, lower alkyl, lower alkoxy,  
hydroxyalkyl, alkoxyalkyl, hydroxy carbonyl,  
cyano, aryloxy,

R<sup>1</sup> represents an alpha-oriented lower  
alkoxycarbonyl or hydroxycarbonyl radical,

15           -B-B- represents the group -CHR<sup>6</sup>-CHR<sup>7</sup>- or an  
alpha- or beta- oriented group:



III

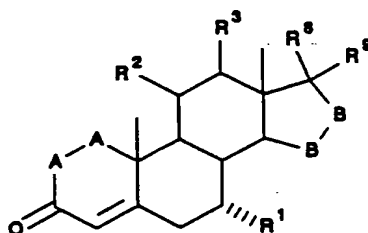
where R<sup>6</sup> and R<sup>7</sup> are independently selected from  
the group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,

20 hydroxycarbonyl, alkyl, alkoxycarbonyl,  
acyloxyalkyl, cyano, aryloxy, and

25  $R^8$  and  $R^9$  are independently selected from the  
group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,  
hydroxycarbonyl, alkyl, alkoxycarbonyl,  
acyloxyalkyl, cyano, aryloxy, or  $R^8$  and  $R^9$   
together comprise a carbocyclic or heterocyclic  
ring structure, or  $R^8$  or  $R^9$  together with  $R^6$  or  
30  $R^7$  comprise a carbocyclic or heterocyclic ring  
structure fused to the pentacyclic D ring.

the process comprising:

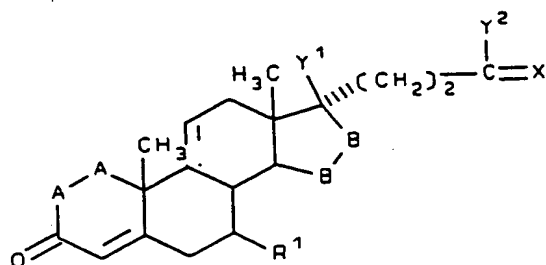
removing an  $11\alpha$ -leaving group from a compound of Formula  
IV:



IV

35 wherein -A-A-,  $R^1$ ,  $R^3$ , -B-B-,  $R^8$ , and  $R^9$  are as defined  
above, and  $R^2$  is a leaving group the abstraction of which  
is effective for generating a double bond between the 9-  
and 11-carbon atoms.

2. A process as set forth in claim 1 wherein  
said compound of Formula II corresponds to Formula IIA:



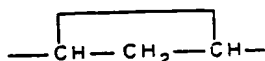
IIA

wherein:

5

-A-A- represents the group  $-\text{CH}_2-\text{CH}_2-$  or  $-\text{CH}=\text{CH}-$ ,

-B-B- represents the group  $-\text{CH}_2-\text{CH}_2-$  or an  
alpha- or beta- oriented group of Formula IIIA:



IIIA

10

$\text{R}^1$  represents an alpha-oriented lower  
alkoxycarbonyl radical,

X represents two hydrogen atoms or oxo,

$\text{Y}^1$  and  $\text{Y}^2$  together represent the oxygen bridge -  
O-, or

$\text{Y}^1$  represents hydroxy, and

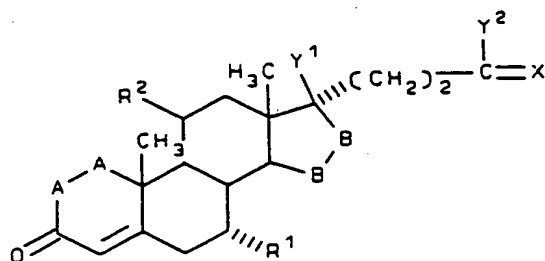
15

$\text{Y}^2$  represents hydroxy, lower alkoxy or, if X  
represents  $\text{H}_2$ , also lower alkanoyloxy,

and salts of compounds in which X represents oxo and  $\text{Y}^2$   
represents hydroxy-, the process comprising:

20

contacting a solution comprising a lower alkanolic acid  
and a salt of a lower alkanolic acid with a compound  
corresponding to Formula IVA:

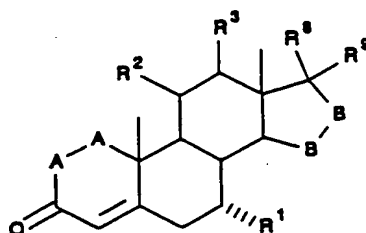


IVA

wherein -A-A-,  $R^1$ , -B-B-, X,  $Y^1$  and  $Y^2$  are as defined in Formula IIA and  $R^2$  is lower alkylsulfonyloxy or acyloxy.

3. A process as set forth in claim 1 wherein said compound of Formula IV is Methyl Hydrogen  $17\alpha$ -Hydroxy- $11\alpha$ -(methylsulfonyl)oxy-3-oxopregn-4-ene- $7\alpha,21$ -dicarboxylate,  $\gamma$ -Lactone and said compound of Formula II
- 5 is Methyl Hydrogen  $17\alpha$ -Hydroxy-3-oxopregna-4,9(11)-diene- $7\alpha,21$ -dicarboxylate,  $\gamma$ -Lactone.

4. A process for the preparation of a compound of Formula IV:



IV

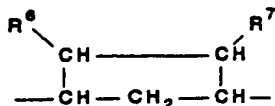
wherein

- 5 -A-A- represents the group - $CHR^4-CHR^5$ - or - $CR^4=CR^5$ -

- $R^3$ ,  $R^4$  and  $R^5$  are independently selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxy carbonyl, cyano, aryloxy,
- 10

$R^1$  represents an alpha-oriented lower  
alkoxycarbonyl or hydroxycarbonyl radical,

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an  
alpha- or beta- oriented group:



III

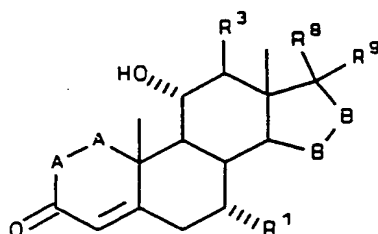
where  $R^6$  and  $R^7$  are independently selected from  
the group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,  
hydroxycarbonyl, alkyl, alkoxycarbonyl,  
acyloxyalkyl, cyano, aryloxy, and

$R^8$  and  $R^9$  are independently selected from the  
group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,  
hydroxycarbonyl, alkyl, alkoxycarbonyl,  
acyloxyalkyl, cyano, aryloxy or  $R^8$  and  $R^9$   
together comprise a carbocyclic or heterocyclic  
ring structure, or  $R^8$  or  $R^9$  together with  $R^6$  or  
 $R^7$  comprise a carbocyclic or heterocyclic ring  
structure fused to the pentacyclic D ring, and

$R^2$  is lower alkylsulfonyloxy or acyloxy or a  
halide.

the process comprising:

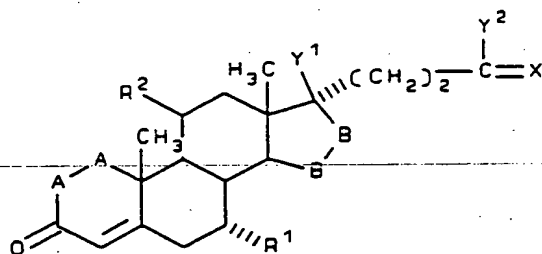
reacting a lower alkylsulfonylating or acylating reagent  
or a halide generating agent such as thionyl halide,  
sulfuryl halide, or oxalyl halide with a compound of  
Formula V



V

wherein -A-A-,  $R^1$ ,  $R^3$ , -B-B-,  $R^8$ , and  $R^9$  are as defined  
40 above.

5. A process as set forth in claim 4 wherein  
said compound of Formula IV corresponds to Formula IVA:



IVA

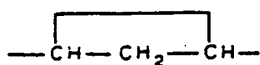
wherein:

5 -A-A- represents the group -CH<sub>2</sub>-CH<sub>2</sub>- or -CH=CH-,

$R^1$  represents an alpha-oriented lower  
alkoxycarbonyl radical,

•  $R^2$  represents lower alkylsulfonyloxy or acyloxy,

10 -B-B- represents the group -CH<sub>2</sub>-CH<sub>2</sub>- or an  
alpha- or beta- oriented group:



IIIA

X represents two hydrogen atoms or oxo,

$Y^1$  and  $Y^2$  together represent the oxygen bridge -

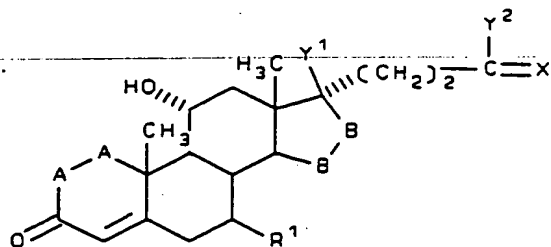
O-, or

15  $Y^1$  represents hydroxy, and

$Y^2$  represents hydroxy, lower alkoxy or, if X represents  $H_2$ , also lower alkanoyloxy,

and salts of compounds in which X represents oxo and  $Y^2$  represents hydroxy-, the process comprising:

20 reacting a lower alkylsulfonyl or acyl halide in the presence of a hydrogen halide scavenger with a compound corresponding to the formula:



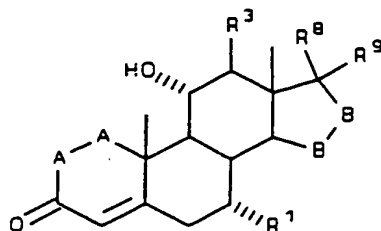
VA

25 wherein -A-A-,  $R^1$ , -B-B-, X,  $Y^1$ , and  $Y^2$  are as defined in Formula IVA.

6. A process as set forth in claim 4 wherein said compound of Formula IV is Methyl Hydrogen  $17\alpha$ -Hydroxy- $11\alpha$ -(methylsulfonyl)oxy-3-oxopregn-4-ene- $7\alpha,21$ -dicarboxylate,  $\gamma$ -Lactone and said compound of Formula V  
5 is Methyl Hydrogen  $11\alpha,17\alpha$ -Dihydroxy-3-oxopregn-4-ene- $7\alpha,21$ -dicarboxylate,  $\gamma$ -Lactone.

7. A process for the preparation of a compound of Formula V:





V

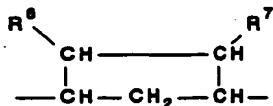
wherein

5            -A-A- represents the group -CHR<sup>4</sup>-CHR<sup>5</sup>- or -  
CR<sup>4</sup>=CR<sup>5</sup>-

10           R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from  
the group consisting of hydrogen, halo,  
hydroxy, lower alkyl, lower alkoxy,  
hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl,  
cyano, aryloxy,

R<sup>1</sup> represents an alpha-oriented lower  
alkoxycarbonyl or hydroxycarbonyl radical,

15           -B-B- represents the group -CHR<sup>6</sup>-CHR<sup>7</sup>- or an  
alpha- or beta- oriented group:



III

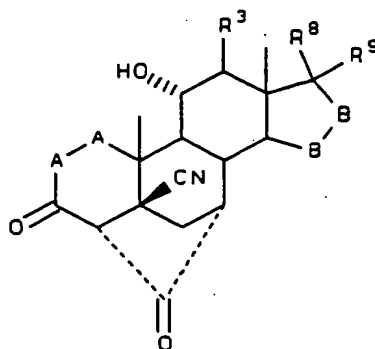
20           where R<sup>6</sup> and R<sup>7</sup> are independently selected from  
the group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,  
hydroxycarbonyl, alkyl, alkoxycarbonyl,  
acyloxyalkyl, cyano, aryloxy, and

R<sup>8</sup> and R<sup>9</sup> are independently selected from the  
group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,

25 hydroxycarbonyl, alkyl, alkoxycarbonyl,  
acyloxyalkyl, cyano, aryloxy, or  $R^8$  and  $R^9$   
together comprise a carbocyclic or heterocyclic  
ring structure, or  $R^8$  or  $R^9$  together with  $R^6$  or  
30  $R^7$  comprise a carbocyclic or heterocyclic ring  
structure fused to the pentacyclic D ring.

the process comprising:

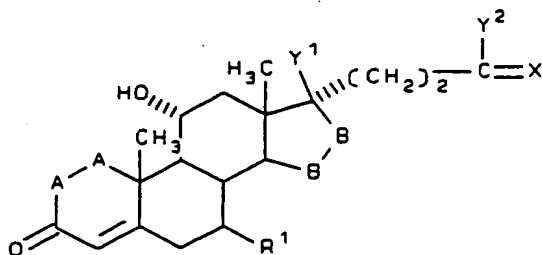
reacting a compound of Formula VI with an alkali metal  
alkoxide corresponding to the formula  $R^{10}OM$  wherein M is  
alkali metal and  $R^{10}O-$  corresponds to the alkoxy  
35 substituent of  $R^1$ , said compound of Formula VI having the  
structure:



VI

wherein  $-A-A-$ ,  $R^3$ ,  $-B-B-$ ,  $R^8$ , and  $R^9$  are as defined  
above.

8. A process as set forth in claim 7 wherein  
the compound of Formula V corresponds to the formula:

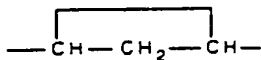


VA

5

R<sup>1</sup> represents an alpha-oriented lower alkoxy carbonyl radical,

10



x represents two hydrogen atoms or oxo,

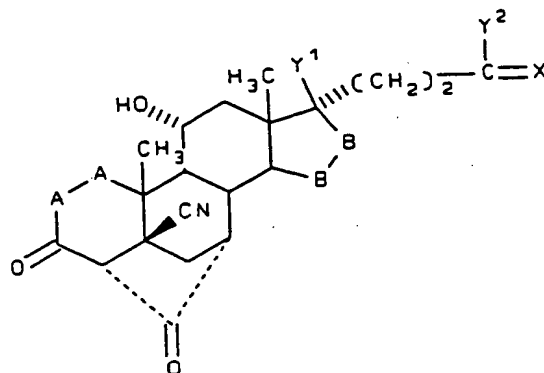
15

Y<sup>2</sup> represents hydroxy, lower alkoxy or, if X represents H<sub>2</sub>, also lower alkanoyloxy,

and salts of compounds in which X represents oxo and Y<sup>2</sup> represents hydroxy-, the process comprising:

20

reacting a compound of Formula VIA with an alkali metal alkoxide corresponding to the formula  $R^{10}OM$  in the presence of an alcohol having the formula  $R^{10}OH$ , wherein M is alkali metal and  $R^{10}O^-$  corresponds to the alkoxy substituent of  $R^1$ , said compound of Formula VI having the structure:



VIA

25

wherein -A-A-, -B-B-,  $Y^1$ ,  $Y^2$  and X are as defined in Formula VA.

9. A process as set forth in claim 7 wherein the compound of Formula V is Methyl Hydrogen  $11\alpha, 17\alpha$ -Dihydroxy-3-oxopregn-4-ene- $7\alpha, 21$ -dicarboxylate,  $\gamma$ -Lactone and the compound of Formula VI is  $4'S(4'\alpha), 7'\alpha$ -  
 5 Hexadecahydro- $11'\alpha$ -hydroxy- $10'\beta, 13'\beta$ -dimethyl- $3', 5, 20'$ -trioxospiro[furan-2(3H),  $17'\beta$ -[4,7]methano[17H]cyclopenta[alphenanthrene]- $5'\beta(2'H)$ -carbonitrile.

10. A process as set forth in claim 7 wherein cyanide ion is formed as a by-product of the reaction, the process further comprising removal of cyanide ion from the reaction zone during the reaction to reduce the extent of any reaction of cyanide ion with the product of Formula V.

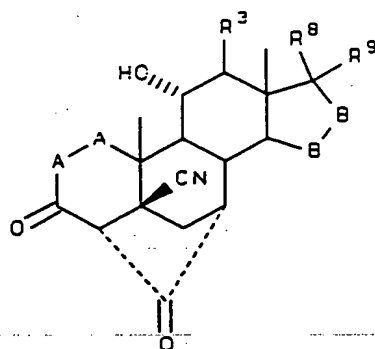
11. A process as set forth in claim 10 wherein cyanide ion is removed from the reaction by precipitation with a precipitating agent.

12. A process as set forth in claim 11 wherein said reaction is carried out in a solvent medium, and said precipitating agent comprises a salt comprising a

cation which forms a cyanide compound of lower solubility in said medium than the solubility of the precipitating agent therein.

13. A process as set forth in claim 12 wherein said cation is selected from the group consisting of alkaline earth metal ions and transition metal ions.

14. A process for the preparation of a compound of Formula VI:



VI

wherein

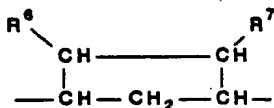
5

-A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

10

$\text{R}^3$ ,  $\text{R}^4$  and  $\text{R}^5$  are independently selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:



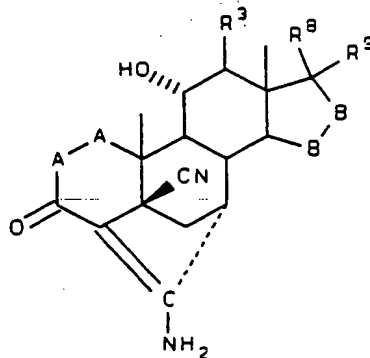
III

15 where  $R^6$  and  $R^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy, and

20  $R^8$  and  $R^9$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy, or  $R^8$  and  $R^9$   
 25 together comprise a carbocyclic or heterocyclic ring structure, or  $R^8$  or  $R^9$  together with  $R^6$  or  $R^7$  comprise a carbocyclic or heterocyclic ring structure fused to the pentacyclic D ring.

the process comprising:

30 hydrolyzing a compound corresponding to Formula VII:

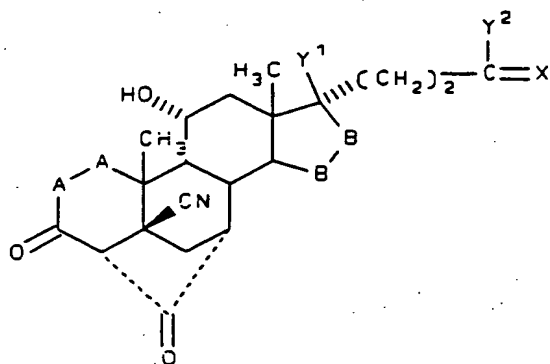


VII

wherein -A-A-,  $R^3$ , -B-B-,  $R^8$ , and  $R^9$  are as defined above.

15. A process as set forth in claim 14 wherein

said compound of Formula VI corresponds to the formula:



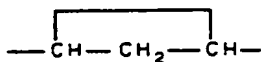
VIA

wherein:

5

-A-A- represents the group  $-\text{CH}_2-\text{CH}_2-$  or  $-\text{CH}=\text{CH}-$ ,

-B-B- represents the group  $-\text{CH}_2-\text{CH}_2-$  or an  
alpha- or beta- oriented group:



IIIA

X represents two hydrogen atoms or oxo,

10

$\text{Y}^1$  and  $\text{Y}^2$  together represent the oxygen bridge -  
O-, or

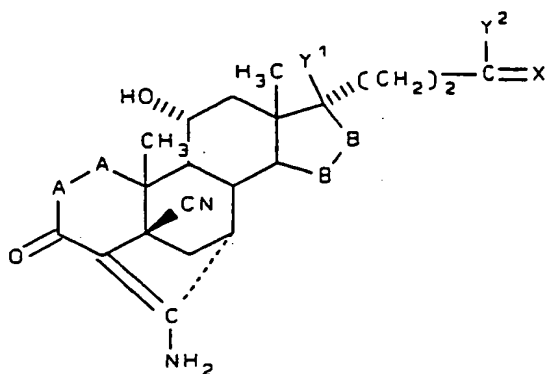
$\text{Y}^1$  represents hydroxy, and

$\text{Y}^2$  represents hydroxy, lower alkoxy or, if X  
represents  $\text{H}_2$ , also lower alkanoyloxy,

15

and salts of compounds in which X represents oxo and  $\text{Y}^2$   
represents hydroxy-, the process comprising:

hydrolyzing a compound of Formula VIIA in the presence of  
an acid and an organic solvent and/or water, said  
compound of Formula VIIA having the structure:



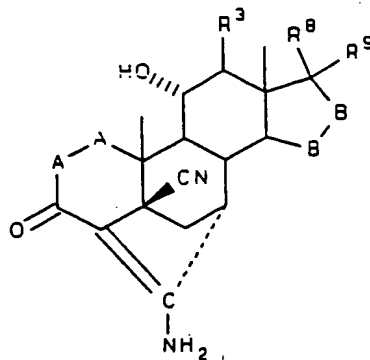
VIIA

wherein -A-A-, -B-B-,  $Y^1$ ,  $Y^2$ , and X are as defined in Formula VIA.

16. A process as set forth in claim 14 wherein said compound of Formula VI is 4'S(4'α), 7'α-Hexadecahydro-11'α-hydroxy-10'β, 13'β-dimethyl-3', 5, 20'-trioxospiro[furan-2(3H), 17'β-

[4, 7]methano[17H]cyclopenta[a]phenanthrene]-5'β(2'H)-carbonitrile and said compound of Formula VII is 5'R(5'α), 7'β-20'-Aminohexadecahydro-11'β-hydroxy-10'α, 13'α-dimethyl-3', 5-dioxospiro[furan-2(3H), 17'α(5'H)-[7, 4]metheno[4H]cyclopenta[a]phenanthrene]-5'-carbonitrile.

17. A process for the preparation of a compound of Formula VII:



VII

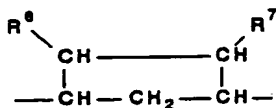
wherein



5 -A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

10  $\text{R}^3$ ,  $\text{R}^4$  and  $\text{R}^5$  are independently selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:



III

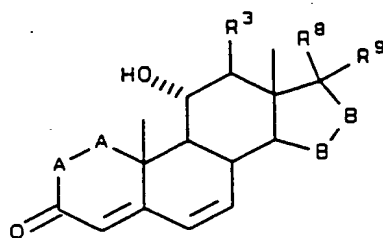
15 where  $\text{R}^6$  and  $\text{R}^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy, and

20  $\text{R}^8$  and  $\text{R}^9$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy, or  $\text{R}^8$  and  $\text{R}^9$   
25 together comprise a carbocyclic or heterocyclic ring structure, or  $\text{R}^8$  or  $\text{R}^9$  together with  $\text{R}^6$  or  $\text{R}^7$  comprise a carbocyclic or heterocyclic ring structure fused to the pentacyclic D ring.

the process comprising:

30 reacting a compound of Formula VIII with a source of cyanide ion in the presence of an alkali metal salt, said

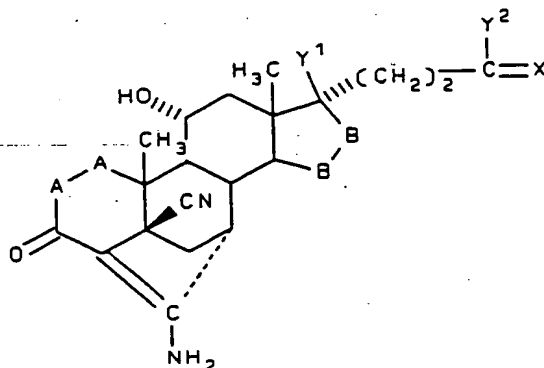
compound of Formula VIII having the structure:



VIII

wherein -A-A-,  $R^3$ , -B-B-,  $R^8$ , and  $R^9$  are as defined above.

18. A process as set forth in claim 17 wherein said compound of Formula VII corresponds to Formula VIIA:

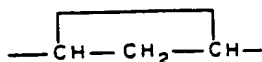


VIIA

wherein:

5        -A-A- represents the group  $-\text{CH}_2-\text{CH}_2-$  or  $-\text{CH}=\text{CH}-$ ,

-B-B- represents the group  $-\text{CH}_2-\text{CH}_2-$  or an  
alpha- or beta- oriented group:



IIIA

X represents two hydrogen atoms or oxo,

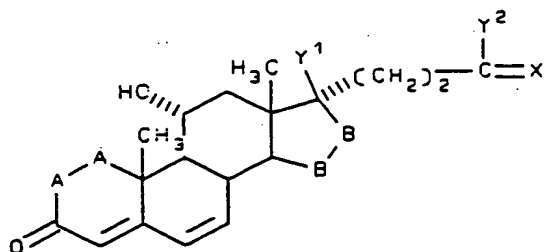
10         $Y^1$  and  $Y^2$  together represent the oxygen bridge -  
O-, or

$Y^1$  represents hydroxy, and

$Y^2$  represents hydroxy, lower alkoxy or, if X represents  $H_2$ , also lower alkanoyloxy,

- 15 and salts of compounds in which X represents oxo and  $Y^2$  represents hydroxy-, the process comprising:

reacting a cyanide source such as ketone cyanohydrin in the presence of LiCl in the presence of a base with an  $11\alpha$ -hydroxy compound corresponding to the formula:



VIIIA

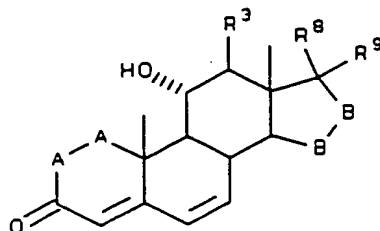
20 wherein -A-A-, -B-B-,  $Y^1$ ,  $Y^2$ , and X are as defined in Formula VIIA.

19. A process as set forth in claim 17 wherein said compound of Formula VII is  $5'R(5'\alpha), 7'\beta$ -20'-Aminohexadecahydro- $11'\beta$ -hydroxy- $10'\alpha, 13'\alpha$ -dimethyl-3',5-dioxospiro[furan-2(3H),  $17'\alpha(5'H)$ ]-

- 5 [7,4]metheno[4H]cyclopenta[alphenanthrene]-5'-carbonitrile and said compound of Formula VIII is  $11\alpha, 17\alpha$ -Dihydroxy-3-oxopregna-4,6-diene-21-carboxylic Acid,  $\gamma$ -Lactone.

20. A process as set forth in claim 17 wherein said source of cyanide ion comprises an alkali metal cyanide, the reaction between said compound of Formula VIII and cyanide ion being carried out in the presence of an acid and water.

21. A process for the preparation of a compound of Formula VIII



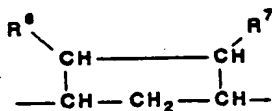
VIII

wherein

5            -A-A- represents the group -CHR⁴-CHR⁵- or -  
CR⁴=CR⁵-

10           R³, R⁴ and R⁵ are independently selected from  
the group consisting of hydrogen, halo,  
hydroxy, lower alkyl, lower alkoxy,  
hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl,  
cyano, aryloxy,

-B-B- represents the group -CHR⁶-CHR⁷- or an  
alpha- or beta- oriented group:



III

15           where R⁶ and R⁷ are independently selected from  
the group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,  
hydroxycarbonyl, alkyl, alkoxycarbonyl,  
acyloxyalkyl, cyano, aryloxy, and

20           R⁸ and R⁹ are independently selected from the  
group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,

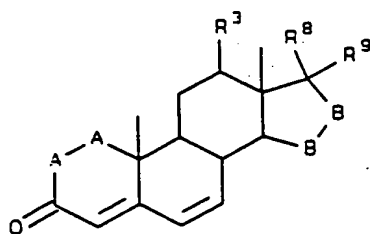
25

hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy, or  $R^8$  and  $R^9$  together comprise a carbocyclic or heterocyclic ring structure, or  $R^8$  and  $R^9$  together with  $R^6$  or  $R^7$  comprise a carbocyclic or heterocyclic ring structure fused to the pentacyclic D ring,

the process comprising:

30

oxidizing a substrate compound corresponding to Formula X by fermentation in the presence of a microorganism effective for introducing an 11-hydroxy group into said substrate in  $\alpha$ -orientation, said substrate corresponding to the formula:



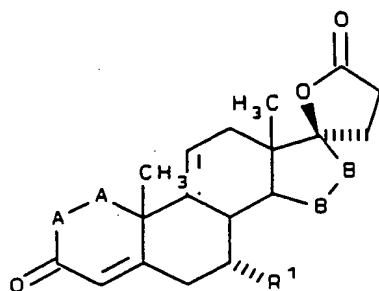
35

XIII

wherein -A-A-,  $R^1$ ,  $R^3$ , -B-B-,  $R^8$ , and  $R^9$  are as defined above.

22. A process as set forth in claim 21 wherein said compound of Formula VIII is 11 $\alpha$ ,17 $\alpha$ -Dihydroxy-3-oxopregna-4,6-diene-21-carboxylic Acid,  $\gamma$ -Lactone.

23. A process for the preparation of a mexrenone derivative corresponding to the formula:



XXXI

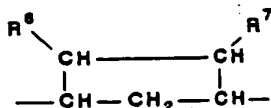
wherein

-A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

$\text{R}^3$ ,  $\text{R}^4$  and  $\text{R}^5$  are independently selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

$\text{R}^1$  represents an alpha-oriented lower alkoxy carbonyl or hydroxycarbonyl radical,

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:

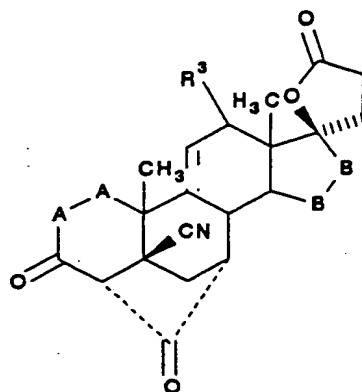


III

where  $\text{R}^6$  and  $\text{R}^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxy carbonyl, acyloxyalkyl, cyano, aryloxy,

the process comprising:

reacting a compound of Formula XIV with an alkali metal alkoxide corresponding to the formula  $R^{10}OM$  wherein M is alkali metal and  $R^{10}O^-$  corresponds to the alkoxy substituent of  $R^1$ , said compound of Formula XIV having the structure:

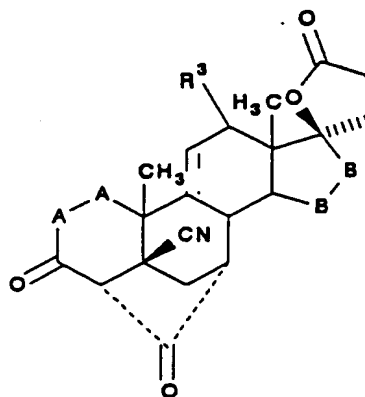


XIV

wherein -A-A-,  $R^3$ , and -B-B-, are as defined above.

24. A process as set forth in claim 23 wherein said compound of Formula XIV is 4'S(4'α),7'α-1',2',3',4,4',5,5',6',7',8',10',12',13',14',15',16'-hexadecahydro-10β-,13'β-dimethyl-3',5,20'-trioxospiro[furan-2(3H),17'β-[4,7]methano[17H]cyclopenta[a]phenanthrene]5'-carbonitrile.

25. A process for the preparation of a compound of Formula XIV:



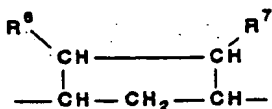
XIV

wherein

5            -A-A- represents the group -CHR<sup>4</sup>-CHR<sup>5</sup>- or -  
CR<sup>4</sup>=CR<sup>5</sup>-

10           R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from  
the group consisting of hydrogen, halo,  
hydroxy, lower alkyl, lower alkoxy,  
hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl,  
cyano, aryloxy,

-B-B- represents the group -CHR<sup>6</sup>-CHR<sup>7</sup>- or an  
alpha- or beta- oriented group:



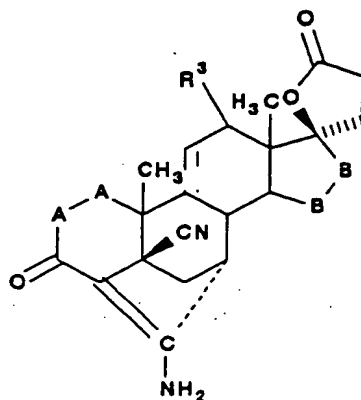
III

15           where R<sup>6</sup> and R<sup>7</sup> are independently selected from  
the group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,  
hydroxycarbonyl, alkyl, alkoxycarbonyl,  
acyloxyalkyl, cyano, aryloxy,

20    the process comprising:



hydrolyzing a compound corresponding to Formula XV:



XV

wherein -A-A-,  $R^3$ , and -B-B- are as defined above.

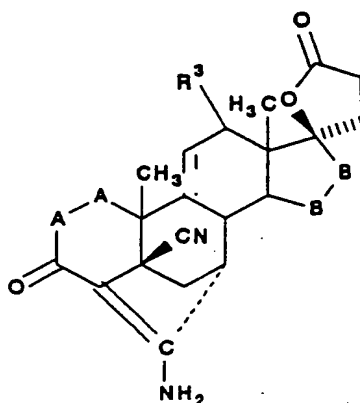
26. A process as set forth in claim 25 wherein said compound of Formula XIV is 4'S(4'α), 7'α-1', 2', 3', 4, 4', 5, 5', 6', 7', 8', 10', 12', 13', 14', 15', 16'-hexadecahydro-10β-, 13'β-dimethyl-3', 5, 20'-

5 trioxospiro[furan-2(3H), 17'β-

[4, 7]methano[17H]cyclopenta[a]phenanthrene] 5'-carbonitrile and said compound of Formula XV is 5'R(5'α), 7'β-20'-amino-

10 1', 2', 3', 4, 5, 6', 7', 8', 10', 12', 13', 14', 15', 16'-tetradecahydro-10'α, 13'α-dimethyl-3', 5-dioxospiro[furan-2(3H), 17'α(5'H)-[7, 4]metheno[4H]cyclopenta[a]phenanthrene]-5'-carbonitrile.

27. A process for the preparation of a compound corresponding to Formula XV:



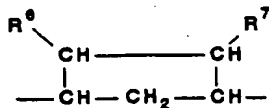
XV

wherein

5            -A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

10            $\text{R}^3$ ,  $\text{R}^4$  and  $\text{R}^5$  are independently selected from  
the group consisting of hydrogen, halo,  
hydroxy, lower alkyl, lower alkoxy,  
hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl,  
cyano, aryloxy,

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an  
alpha- or beta- oriented group:

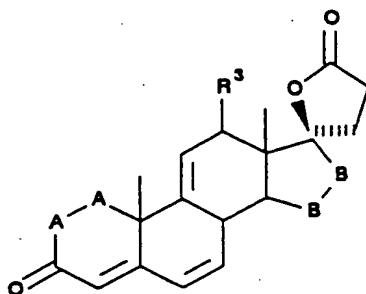


III

15           where  $\text{R}^6$  and  $\text{R}^7$  are independently selected from  
the group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,  
hydroxycarbonyl, alkyl, alkoxycarbonyl,  
acyloxyalkyl, cyano, aryloxy,

20           the process comprising:

reacting a compound of Formula XVI with a source of cyanide ion in the presence of an alkali metal salt, said compound of Formula XVI having the structure:

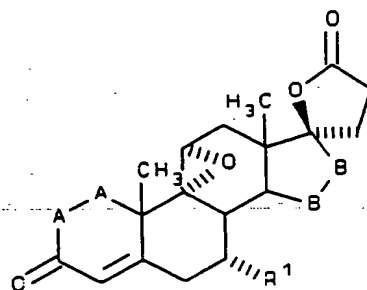


XVI

25 wherein -A-A-,  $R^3$ , and -B-B- are as defined above.

28. A process as set forth in claim 27 wherein said compound of Formula XV is Methyl Hydrogen  $9\alpha,17\alpha$ -dihydroxy-3-oxopregn-4-ene- $7\alpha,21$ -dicarboxylate,  $\gamma$ -lactone.

29. A process for the preparation of a compound corresponding to the formula:



XXXII

wherein

5

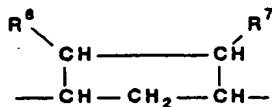
-A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

$R^3$ ,  $R^4$  and  $R^5$  are independently selected from

10 the group consisting of hydrogen, halo,  
hydroxy, lower alkyl, lower alkoxy,  
hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl,  
cyano, aryloxy,

$R^1$  represents an alpha-oriented lower  
alkoxycarbonyl or hydroxycarbonyl radical,

15 -B-B- represents the group  $-CHR^6-CHR^7-$  or an  
alpha- or beta- oriented group:

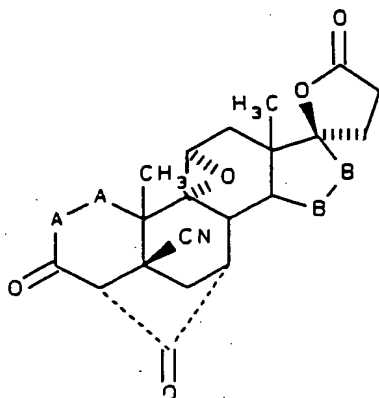


III

20 where  $R^6$  and  $R^7$  are independently selected from  
the group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,  
hydroxycarbonyl, alkyl, alkoxycarbonyl,  
acyloxyalkyl, cyano, aryloxy,

the process comprising:

25 reacting a compound of Formula XXI with an alkali metal  
alkoxide corresponding to the formula  $R^{10}OM$  wherein M is  
alkali metal and  $R^{10}O-$  corresponds to the alkoxy  
substituent of  $R^1$ , said compound of Formula XXI having the  
structure:

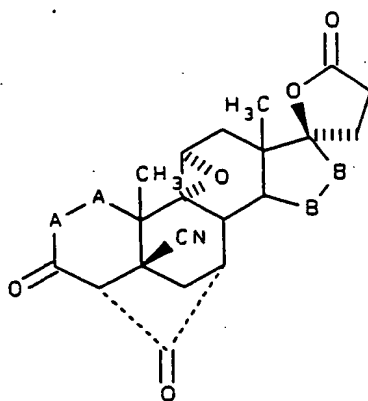


XXI

wherein -A-A-  $R^1$ ,  $R^3$ , and -B-B- are as defined above.

30. A process as set forth in claim 29 wherein said compound of Formula XXI is 4'S(4' $\alpha$ ), 7' $\alpha$ -9', 11 $\alpha$ -epoxyhexadecahydro-10 $\beta$ -, 13' $\beta$ -dimethyl-3'5, 20'-trioxospiro[furan-2(3H), 17' $\beta$ -  
 5 [4,7]methano[17H]cyclopenta[ $\alpha$ ]phenanthrene-5'-carbonitrile.

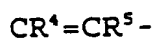
31. A process for the preparation of a compound corresponding to Formula XXI:



XXI

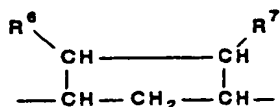
wherein

- 5 -A-A- represents the group -CHR<sup>1</sup>-CHR<sup>5</sup>- or -



$R^3$ ,  $R^4$  and  $R^5$  are independently selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

-B-B- represents the group  $-CHR^6-CHR^7-$  or an alpha- or beta- oriented group:

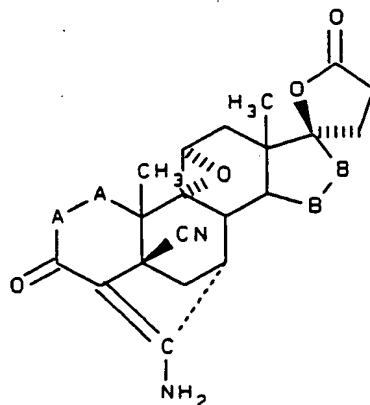


III

where  $R^6$  and  $R^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy,

the process comprising:

hydrolyzing a compound corresponding to Formula XXII:



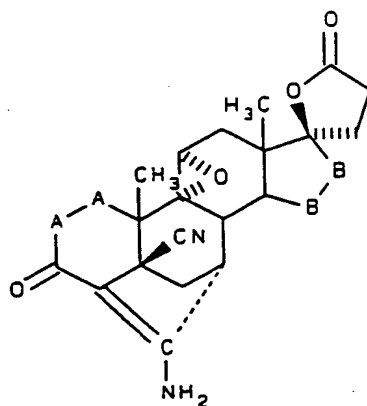
XXII

wherein -A-A-,  $R^3$ , and -B-B- are as defined above.

32. A process as set forth in claim 31 wherein said compound of Formula XXI is 4'S(4'α),7'α-9',11α-epoxyhexadecahydro-10β-,13'β-dimethyl-3'5,20'-trioxospiro[furan-2(3H),17'β-

5 [4,7]methano[17H]cyclopenta[alphenanthrene-5'-carbonitrile and said compound of Formula XXII is 5'R(5'α),7'β-20'-amino-9,11β-epoxyhexadecahydro-10',13'-dimethyl-3',5-dioxospiro[furan-2(3H),17'a(5'H)-  
10 [7,4]methene[4H]cyclopenta[a]phenanthrene-5'-carbonitrile.

33. A process for the preparation of a compound corresponding to Formula XXII:



XXII

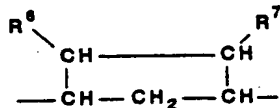
wherein

5 -A-A- represents the group -CHR<sup>4</sup>-CHR<sup>5</sup>- or -  
CR<sup>4</sup>=CR<sup>5</sup>-

R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from  
the group consisting of hydrogen, halo,  
hydroxy, lower alkyl, lower alkoxy,  
10 hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl,  
cyano, aryloxy,

-B-B- represents the group -CHR<sup>6</sup>-CHR<sup>7</sup>- or an

alpha- or beta- oriented group:



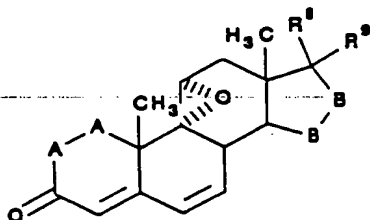
III

15

where R<sup>6</sup> and R<sup>7</sup> are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy,

20 the process comprising:

reacting a compound of Formula XXIII with a source of cyanide ion in the presence of an alkali metal salt, said compound of Formula VIII having the structure:



XXIII

25 wherein -A-A-, R<sup>3</sup>, and -B-B- are as defined above.

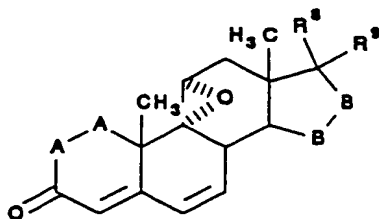
34. A process as set forth in claim 33 wherein said compound of Formula XXII is 5'R(5'α), 7'β-20'-amino-9,11β-epoxyhexadecahydro-10',13'-dimethyl-3',5-dioxospiro[furan-2(3H), 17'a(5'H)]-

5 [7,4]methene[4H]cyclopenta[alphenanthrene-5'-carbonitrile and said compound of Formula XXII is 9,11α-epoxy-17α-hydroxy-3-oxopregna-4,6-diene-21-carboxylic acid, γ-lactone.

35. A process for the preparation of a



compound corresponding to Formula XIII:



XXIII

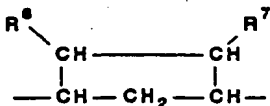
wherein

5            -A-A- represents the group -CHR<sup>4</sup>-CHR<sup>5</sup>- or -  
CR<sup>4</sup>=CR<sup>5</sup>-

10           R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from  
the group consisting of hydrogen, halo,  
hydroxy, lower alkyl, lower alkoxy,  
hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl,  
cyano, aryloxy,

R<sup>1</sup> represents an alpha-oriented lower  
alkoxycarbonyl radical,

15           -B-B- represents the group -CHR<sup>6</sup>-CHR<sup>7</sup>- or an  
alpha- or beta- oriented group:

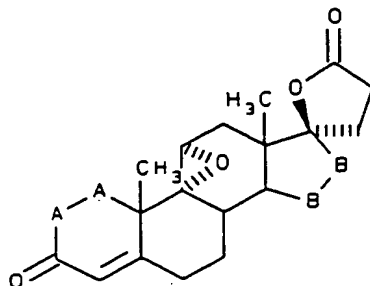


III

20           where R<sup>6</sup> and R<sup>7</sup> are independently selected from  
the group consisting of hydrogen, halo, lower  
alkoxy, acyl, hydroxyalkyl, alkoxyalkyl,  
hydroxycarbonyl, alkyl, alkoxycarbonyl,  
acyloxyalkyl, cyano, aryloxy,

the process comprising:

abstracting hydrogen from the 6 and 7 positions of a compound corresponding to the formula:

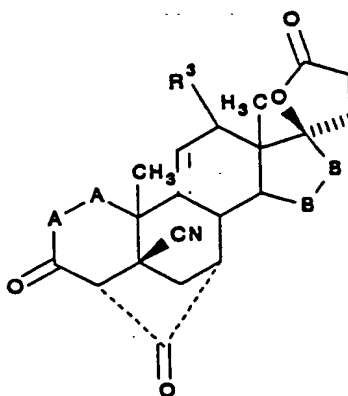


XXIV

25

wherein -A-A-,  $R^3$ , and -B-B- are as defined above.

36. A process for the preparation of a compound of Formula XIV:



XIV

wherein

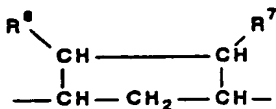
5

-A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

10

$R^3$ ,  $R^4$  and  $R^5$  are independently selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:

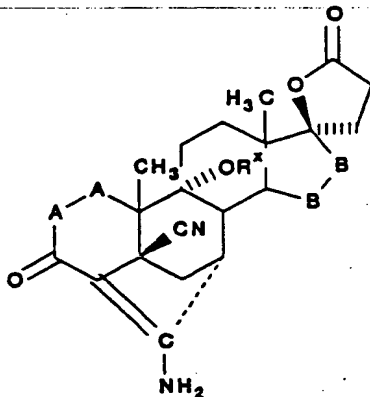


III

15 where  $\text{R}^6$  and  $\text{R}^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy,

20 the process comprising:

hydrolyzing a compound corresponding to Formula XXV:



XXV

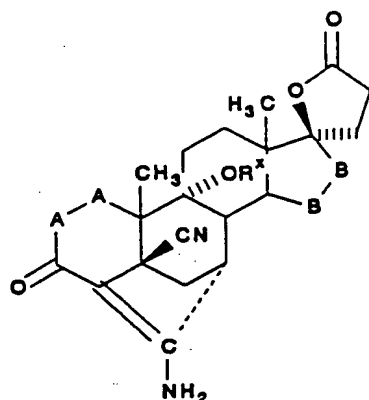
wherein  $\text{R}^*$  is a hydroxyl protecting group and

wherein -A-A-,  $\text{R}^3$ , -B-B-,  $\text{R}^8$ , and  $\text{R}^9$  are as defined above.

37. A process as set forth in claim 36 wherein said compound of Formula XIV is 4'S(4'α),7'α-1',2',3',4,4',5,5',6',7',8',10',12',13',14',15',16'-hexadecahydro-10β-,13'β-dimethyl-3',5,20'-

5 trioxospiro[furan-2(3H), 17'β-  
[4,7]methano[17H]cyclopenta[a]phenanthrene]5'-  
carbonitrile and said compound of Formula XXV is  
5'R(5'α), 7'β-20'-aminohexadecahydro-9'β-hydroxy-  
10'a, 13'α-dimethyl-3', 5-dioxospiro[furan-2(3H), 17'α(5'H)-  
10 [7,4]metheno[4H]cyclopenta[a]phenanthrene]-5'-  
carbonitrile.

38. A process for the preparation of a  
compound corresponding to Formula XXV:



XXV

wherein

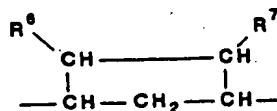
5

-A-A- represents the group -CHR<sup>4</sup>-CHR<sup>5</sup>- or -  
CR<sup>4</sup>=CR<sup>5</sup>-

10

R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from  
the group consisting of hydrogen, halo,  
hydroxy, lower alkyl, lower alkoxy,  
hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl,  
cyano, aryloxy,

-B-B- represents the group -CHR<sup>6</sup>-CHR<sup>7</sup>- or an  
alpha- or beta- oriented group:



III

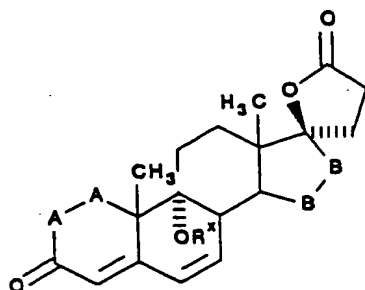
15 where  $R^6$  and  $R^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy, and

20  $R^8$  and  $R^9$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy, or  $R^8$  and  $R^9$   
 25 together comprise a carbocyclic or heterocyclic ring structure,

where  $R^*$  is a hydroxy protecting group,

the process comprising:

30 reacting a compound of Formula XXVI with a source of cyanide ion in the presence of an alkali metal salt, said compound of Formula XXVI having the structure:



XXVI

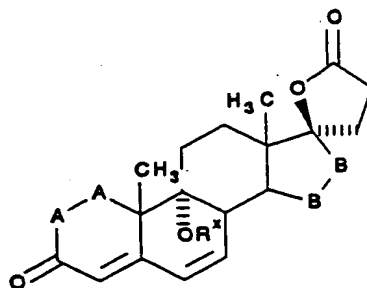
wherein -A-A-,  $R^3$ , and -B-B- are as defined above.

39. A process as set forth in claim 38 wherein

said compound of Formula XXV is 5'R(5' $\alpha$ ),7' $\beta$ -20'-aminohexadecahydro-9' $\beta$ -hydroxy-10'a,13' $\alpha$ -dimethyl-3',5-dioxospiro[furan-2(3H),17' $\alpha$ (5'H)]-

- 5 [7,4]metheno[4H]cyclopenta[a]phenanthrene]-5'-carbonitrile and said compound of Formula XXVI is 9 $\alpha$ ,17 $\alpha$ -dihydroxy-3-oxopregna-4,6-diene-21-carboxylic acid,  $\gamma$ -lactone.

40. A process for the preparation of a compound corresponding to Formula XXVI:



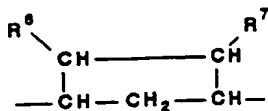
XXVI

wherein

- 5 -A-A- represents the group -CHR<sup>4</sup>-CHR<sup>5</sup>- or -CR<sup>4</sup>=CR<sup>5</sup>-

- 10 R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

-B-B- represents the group -CHR<sup>6</sup>-CHR<sup>7</sup>- or an alpha- or beta- oriented group:



III

15

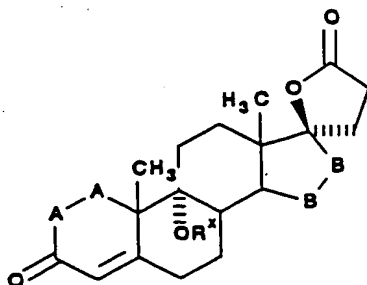
where  $R^6$  and  $R^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy,

20

where  $R^*$  is a hydroxy protecting group,

the process comprising:

abstracting hydrogens from the 6 and 7 positions (dehydrogenation) of a compound corresponding to the formula:



25

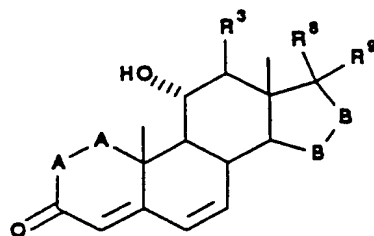
XXVII

wherein -A-A-,  $R^1$ , and -B-B- are as defined above.

5

41: A process as set forth in claim 40 wherein said compound of Formula XXVI is 9 $\alpha$ ,17 $\alpha$ -dihydroxy-3-oxopregna-4,6-diene-21-carboxylic acid,  $\gamma$ -lactone and said compound of Formula XXVII is 9 $\alpha$ ,17 $\alpha$ -dihydroxy-3-oxopregn-4-ene-21-carboxylic acid,  $\gamma$ -lactone.

42. A process for the preparation of a compound corresponding to Formula VIII:



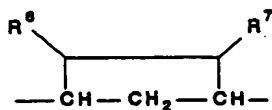
VIII

wherein

-A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

$\text{R}^3$  is selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:



III

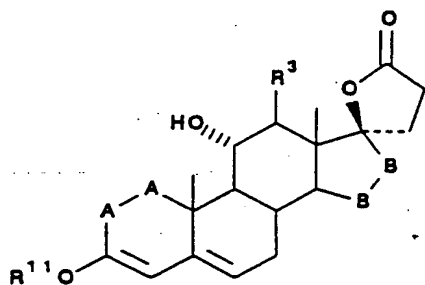
where  $\text{R}^6$  and  $\text{R}^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy, and

$\text{R}^8$  and  $\text{R}^9$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy or  $\text{R}^8$  and  $\text{R}^9$  together comprise a carbocyclic or heterocyclic ring structure, or  $\text{R}^8$  and  $\text{R}^9$  together with  $\text{R}^6$  or



R<sup>7</sup> comprise a carbocyclic or heterocyclic ring structure fused to the pentacyclic D ring,

the process comprising:  
oxidizing a compound of Formula corresponding to  
Formula 104



wherein -A-A-, R<sup>3</sup>, and -B-B- are as defined above and R<sup>11</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl.

43. A process as set forth in claim 42 wherein the compound of Formula VIII is contacted with an oxidizing agent.

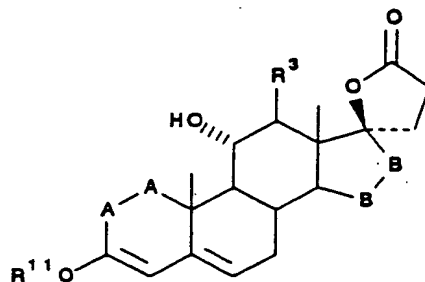
44. A process as set forth in claim 43 wherein said oxidizing agent is a benzoquinone derivative.

45. A process as set forth in claim 44 wherein said oxidizing agent is selected from the group consisting of 2,3,-dichloro-5,6-dicyano-1,4-benzoquinone and tetrachlorobenzoquinone.

46. A process as set forth in claim 42 wherein said compound of Formula 104 is contacted with a halogenating agent to produce a halogenated intermediate; and contacting said halogenated intermediate with a dehydrohalogenating agent to dehydrohalogenate said halogenated intermediate and form said compound of

Formula 104.

47. A process for the preparation of a compound corresponding to Formula 104:



104

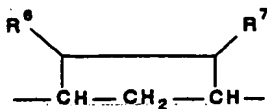
wherein

-A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

$\text{R}^3$  is selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

$\text{R}^{11}$  is  $\text{C}_1$  to  $\text{C}_4$  lower alkyl;

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:

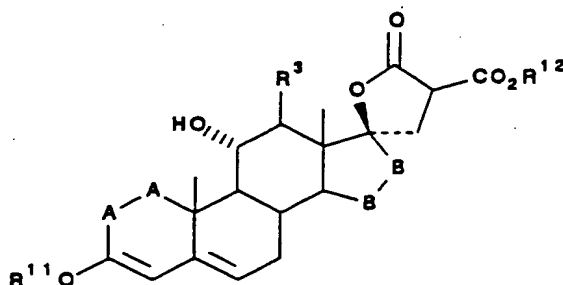


III

where  $\text{R}^6$  and  $\text{R}^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy,

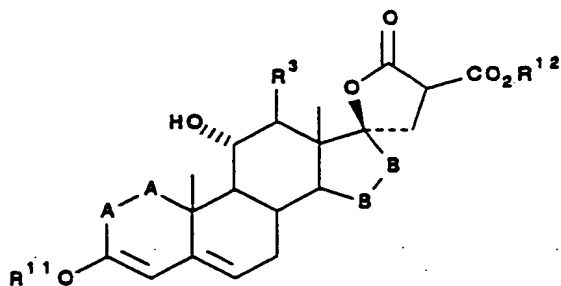
the process comprising:

thermally decomposing a compound corresponding to Formula 103 in the presence of an alkali metal halide, said compound of Formula 103 having the structure:



wherein -A-A-,  $R^3$ ,  $R^{11}$ , and -B-B- are as defined above and  $R^{12}$  is  $C_1$ - $C_4$  alkyl.

48. A process for the preparation of a compound corresponding to Formula 103:



103

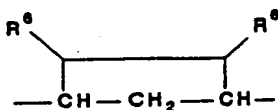
wherein

-A-A- represents the group  $-CHR^4-CHR^5-$  or  $-CR^4=CR^5-$

$R^3$  is selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

$R^{11}$  is  $C_1$ - $C_4$  lower alkyl;

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:

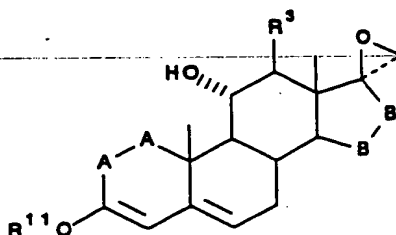


III

where  $R^6$  and  $R^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy,

the process comprising:

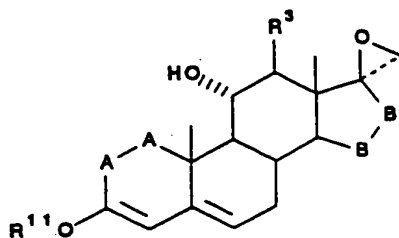
condensing a compound of Formula 102 with a dialkyl malonate in the presence of a base, said compound of Formula 102 having the structure:



102

wherein -A-A-,  $R^3$ ,  $R^{11}$ , and -B-B- are as defined above.

49. A process for the preparation of a compound corresponding to Formula 102:



102

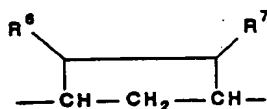
wherein

-A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

$\text{R}^3$  is selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

$\text{R}^{11}$  is  $\text{C}_1$  to  $\text{C}_4$  alkyl;

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:

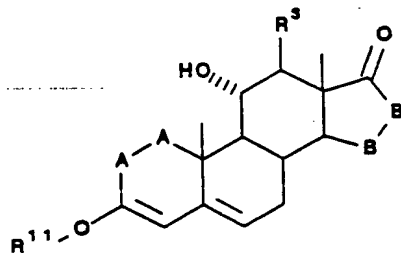


III

where  $\text{R}^6$  and  $\text{R}^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy,

the process comprising:

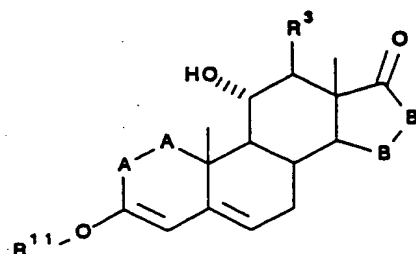
reacting a compound of Formula 101 with a sulfonium ylide in the presence of a base, said compound of Formula 101 having the structure:



101

wherein -A-A-,  $\text{R}^3$ , and -B-B- are as defined above.

50. A process for the preparation of a compound corresponding to Formula 101:



101

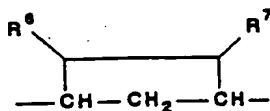
wherein

-A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

$\text{R}^3$  is selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

$\text{R}^{11}$  is  $\text{C}_1-\text{C}_4$  alkyl;

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:



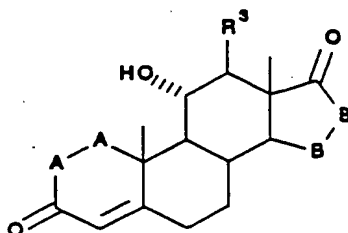
III

where  $\text{R}^6$  and  $\text{R}^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy,

the process comprising:

reacting a compound of Formula XXXVI with an etherifying

reagent in the presence of an acid catalyst, said compound of Formula XXXVI having the structure:

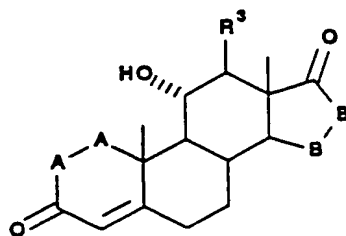


XXXVI

wherein -A-A-,  $R^3$ , and -B-B- are as defined above.

51. A process as set forth in claim 50 wherein said compound of Formula 101 prepared by reacting a compound of Formula XXXVI with a trialkyl orthoformate in an acidified alkanol solvent.

52. A process for the preparation of a compound of Formula XXXVI



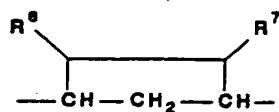
XXXVI

wherein

-A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

$R^3$  is selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:

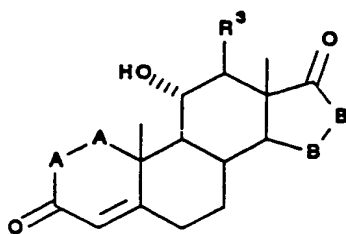


III

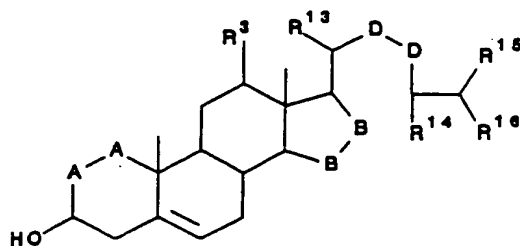
where  $\text{R}^6$  and  $\text{R}^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy,

the process comprising:

oxidizing a substrate compound of Formula XXXVII by fermentation in the presence of a microorganism effective for conversion of said substrate compound to a compound of Formula XXXVI



where -A-A-, -B-B- and  $\text{R}^3$  are as defined above, said substrate compound of Formula XXXVII corresponding to the Formula:

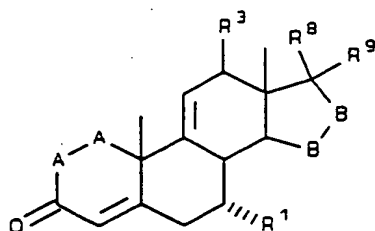


XXXVII



wherein -A-A-,  $R^1$ ,  $R^3$ , -B-B-, and are as defined above and D-D is  $-\text{CH}_2-\text{CH}_2-$  or  $-\text{CH}=\text{CH}-$  and  $R^{13}$ ,  $R^{14}$ ,  $R^{15}$ , and  $R^{16}$  are independently selected from the group consisting of  $\text{C}_1-\text{C}_4$  alkyl; and thereafter introducing an 11-hydroxy group into said  $\alpha$ -orientation in said compound of Formula XXXVI by fermentation in the presence of a microorganism effective for the  $11\alpha$ -hydroxylation.

53. A process for the preparation of a compound corresponding to Formula II:



II

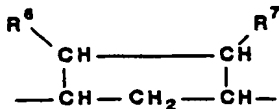
wherein:

-A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

$R^3$ ,  $R^4$  and  $R^5$  are independently selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, cyano, aryloxy,

$R^1$  represents an alpha-oriented lower alkoxy carbonyl or hydroxycarbonyl radical,

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:



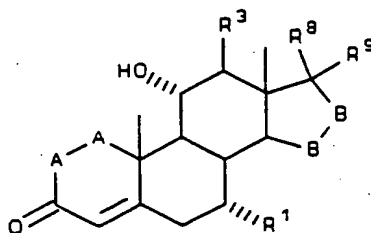
III

where  $R^6$  and  $R^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy, and

$R^8$  and  $R^9$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxycarbonyl, acyloxyalkyl, cyano, aryloxy, or  $R^8$  and  $R^9$  together comprise a carbocyclic or heterocyclic ring structure,

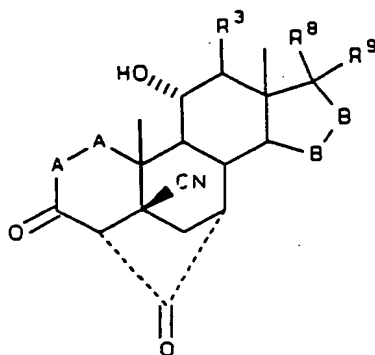
the process comprising:

preparing a compound of Formula V



V

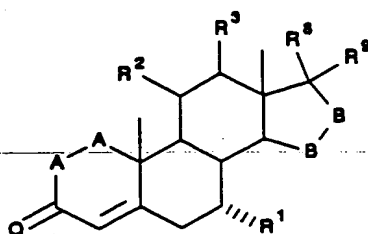
wherein -A-A-,  $R^1$ ,  $R^3$ , -B-B-,  $R^8$ , and  $R^9$  are as defined above by reacting a compound of Formula VI with an alkali metal alkoxide corresponding to the formula  $R^{10}OM$  wherein M is alkali metal and  $R^{10}O^-$  corresponds to the alkoxy substituent of  $R^1$ , said compound of Formula VI having the structure:



VI

wherein -A-A-, R<sup>3</sup>, -B-B-, R<sup>8</sup>, and R<sup>9</sup> are as defined above;

without isolating said compound of Formula V in purified form, reacting said compound of Formula V with a lower alkylsulfonylating or acylating reagent to produce a compound of Formula IV



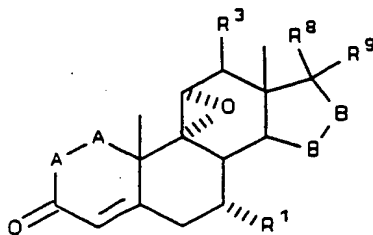
IV

wherein -A-A-, R<sup>1</sup>, R<sup>3</sup>, -B-B-, R<sup>8</sup>, and R<sup>9</sup> are as defined above, and R<sup>2</sup> is alkylsulfonyloxy, acyloxy leaving group or halide;

without isolating said compound of Formula IV in purified form, removing the 11 $\alpha$ -leaving group therefrom by reaction with a reagent for abstraction thereof to produce said compound of Formula II.

54. A process as set forth in claim 53 wherein, without isolating said compound of Formula II in purified form, said compound of Formula II is reacted with an epoxidizing reagent to form a product of

Formula I



I

wherein -A-A-,  $R^1$ ,  $R^3$ , -B-B-,  $R^8$ , and  $R^9$  are as defined above.

55. A process as set forth in claim 54  
wherein:

said compound of Formula II is formed by reaction of said compound of Formula IV with a leaving group removing reagent comprising an alkanolic acid in the presence of an alkali metal alkoxide;

volatile components are stripped from the reaction solution;

water-soluble components of the reaction solution are removed by washing with an aqueous washing solution, thereby producing residual Formula II solution suitable for conversion of the compound of Formula II to a compound of Formula I; and

a peroxide oxidizing agent is combined with the residual Formula II solution to effect the conversion of the compound of Formula II to the compound of Formula I.

56. A process as set forth in claim 54  
wherein:

said compound of Formula V is formed by reaction of said compound of Formula VI with an alkali metal alkoxide in an organic solvent;

the compound of Formula V is extracted from a solution comprising the Formula V reaction solution using an organic solvent, thereby producing a Formula V extract solution; and

a lower alkylsulfonyl halide or acyl halide is introduced into a solution comprising said Formula V extract solution for preparation of the compound of Formula VI.

57. A process as set forth in claim 54 wherein:

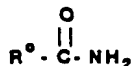
said compound of Formula IV is formed by reaction of said compound of Formula V with a leaving group abstraction reagent in an organic solvent;

a solution comprising the Formula IV reaction solution is passed over an acidic and then a basic exchange resin column for the removal of basic and acidic impurities therefrom, thereby producing Formula IV eluate solution; and

a reagent for abstraction of an alkylsulfonyloxy or acyloxy leaving group is combined with a solution comprising said Formula IV eluate solution for preparation of said compound of Formula II.

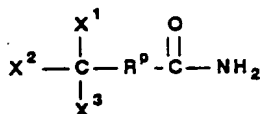
58. A process for the formation of an epoxy compound comprising contacting a substrate compound having an olefinic double bond with a peroxide compound in the presence of a peroxide activator, said peroxide

activator corresponding to the formula:



where R is a substituent having an electron withdrawing strength not less than that monochloromethyl.

59. A process as set forth in claim 58 wherein said peroxide activator corresponds to the formula



where  $\text{X}^1$ ,  $\text{X}^2$ , and  $\text{X}^3$  are selected from the group consisting of halo, hydrogen, alkyl, haloalkyl, cyano and cyanoalkyl,  $\text{R}^{\text{p}}$  is selected from the group consisting of arylene and  $-(\text{CX}^4\text{X}^5)_n-$ , and  $n$  is 0, or 1, at least one of  $\text{X}^1$ ,  $\text{X}^2$ ,  $\text{X}^3$ ,  $\text{X}^4$  and  $\text{X}^5$  being halo or perhaloalkyl.

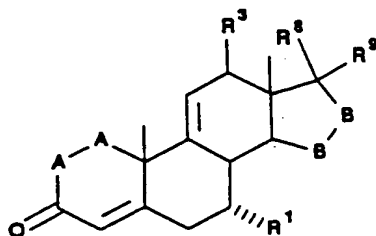
60. A process as set forth in claim 58 wherein  $n$  is 0 and at least two of  $\text{X}^1$ ,  $\text{X}^2$  and  $\text{X}^3$  are halo or perhaloalkyl.

61. A process as set forth in claim 58 wherein all of  $\text{X}^1$ ,  $\text{X}^2$ ,  $\text{X}^3$ ,  $\text{X}^4$  and  $\text{X}^5$  are halo or perhaloalkyl.

62. A process as set forth in claim 58 wherein said peroxide activator is a trihaloacetamide.

63. A process as set forth in claim 62 wherein said peroxide activator is trichloroacetamide.

64. A process as set forth in claim 58 wherein said substrate compound corresponds to the Formula:



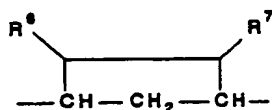
wherein

-A-A- represents the group  $-\text{CHR}^4-\text{CHR}^5-$  or  $-\text{CR}^4=\text{CR}^5-$

$\text{R}^3$ , is selected from the group consisting of hydrogen, halo, hydroxy, lower alkyl, lower alkoxy, hydroxyalkyl, alkoxyalkyl, hydroxy carbonyl, cyano, aryloxy,

$\text{R}^1$  represents an alpha-oriented lower alkoxy carbonyl or hydroxycarbonyl radical,

-B-B- represents the group  $-\text{CHR}^6-\text{CHR}^7-$  or an alpha- or beta- oriented group:



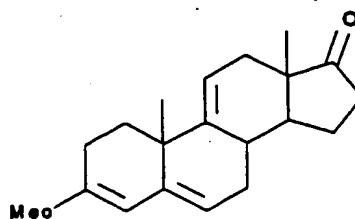
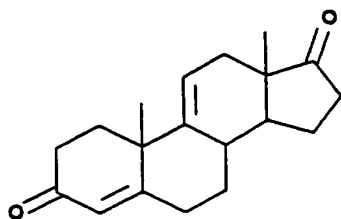
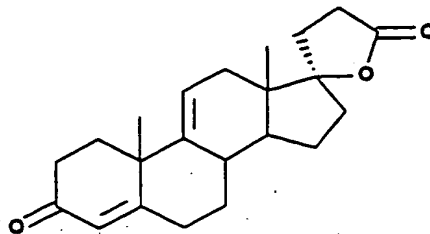
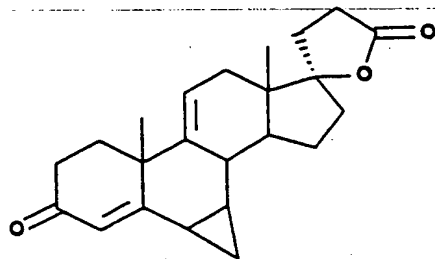
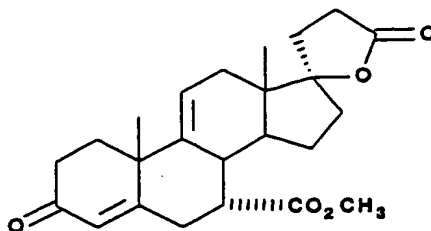
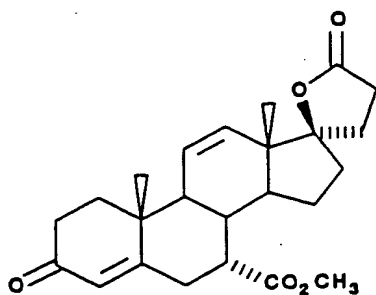
III

where  $\text{R}^6$  and  $\text{R}^7$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxy carbonyl, acyloxyalkyl, cyano, aryloxy, and

$\text{R}^8$  and  $\text{R}^9$  are independently selected from the group consisting of hydrogen, halo, lower alkoxy, acyl, hydroxyalkyl, alkoxyalkyl, hydroxycarbonyl, alkyl, alkoxy carbonyl,

acyloxyalkyl, cyano, aryloxy, or  $R^8$  and  $R^9$  together comprise a carbocyclic or heterocyclic ring structure, or  $R^8$  or  $R^9$  together with  $R^6$  or  $R^7$  comprise a carbocyclic or heterocyclic ring structure fused to the pentacyclic D ring.

65. A process as set forth in claim 58 wherein said substrate compound is selected from the group consisting of:





and the product of the epoxidation reaction is selected from the group consisting of:

